

BARN OWL DIET INCLUDES MAMMAL SPECIES NEW TO THE ISLAND FAUNA OF THE GREAT SALT LAKE

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ABSTRACT.—An investigation of the diet of the Common Barn-owl (*Tyto alba*) on Antelope Island, Great Salt Lake, Utah, yielded four mammal species not previously known to occur on any island in the Great Salt Lake (*Microtus pennsylvanicus*, *M. montanus*, *Ondatra zibethicus*, and a *Sorex* sp.). Two other species, known from other islands, were added to the list of fauna of Antelope Island (*Perognathus parvus* and *Reithrodontomys megalotis*). The barn owl diet on Antelope Island was remarkably like that of barn owls feeding in farmlands adjacent to the Great Salt Lake despite major vegetational differences.

Relatively little collecting for small mammals has occurred on islands in the Great Salt Lake, Utah; the remoteness of several islands and private ownership of others have discouraged a thorough examination of their mammalian fauna. Bowers (1983) compiled a list of nonvolant, native mammal species known to occur on these islands from previously published studies.

In this paper I document the occurrence of four mammal species previously unreported on any island in the Great Salt Lake and add two additional species to the list for Antelope Island. These mammals were identified among prey remains in pellets of the Common Barn-owl (*Tyto alba*) nesting on Antelope Island. Barn owls have taken certain small mammals in several other localities before mammalogists were aware of the existence of the mammals there (e.g., Stickel and Stickel 1948, Twente and Baker 1951). I also compare the island diet with prey eaten by barn owls feeding in farmlands adjacent to the Great Salt Lake.

METHODS

Regurgitated pellets were collected from a barn owl nest site at the Dooley Ranch on the east-central shore of Antelope Island, Davis County, Utah. The nest was in an abandoned agricultural silo. Pellets were gathered once or twice a year in spring or summer from 1980 through 1984. I documented nesting at the collection site from 1981 through 1984 and

believe that nesting probably occurred in 1980 as well. Thus, the material consisted of prey of pairs of owls and their young.

I treated pellets with a sodium hydroxide solution to dissolve hair and feathers. Bones were identified and quantified by standard procedures (Marti 1974).

RESULTS AND DISCUSSION

The barn owl diet on Antelope Island was typical of the foods of this species elsewhere (Wallace 1948, Glue 1967, Marti 1974), being heavily dominated by mammalian prey (98.4%, Table 1). Three rodents in the diet, meadow vole (*Microtus pennsylvanicus*), montane vole (*M. montanus*), and muskrat (*Ondatra zibethicus*), had not previously been known to occur on any island in the Great Salt Lake, nor had shrews (*Sorex* sp.). The shrews were most likely *S. vagrans*, which occurs on the adjacent lake shore (Durrant 1952). The Great Basin pocket mouse (*Perognathus parvus*) and the western harvest mouse (*Reithrodontomys megalotis*), which also occurred in the owl diet, had not been reported previously for Antelope Island but were known from other islands in the Great Salt Lake (Bowers 1983).

Even though little is known about small mammal populations on these islands, several apparent anomalies existed between the owl diet and probable prey abundance and distribution. The heavy domination by voles was the most surprising aspect of the barn owl

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TABLE 1. Prey of Common Barn-Owls on Antelope Island, Great Salt Lake, Utah.

| Prey | Percent of prey numbers | | | | | Totals | |
|------------------------------------|-------------------------|------|------|------|------|--------|---------|
| | 1980 | 1981 | 1982 | 1983 | 1984 | No. | Percent |
| <i>Sorex</i> sp. | 2.0 | 2.3 | 3.6 | 2.8 | 3.6 | 73 | 2.7 |
| <i>Sylvilagus nuttallii</i> (juv.) | 0.1 | — | — | — | — | 1 | tr. |
| <i>Perognathus parvus</i> | 0.5 | — | — | — | — | 6 | 0.2 |
| <i>Dipodomys ordii</i> | 0.2 | — | — | — | 0.3 | 5 | 0.2 |
| <i>Reithrodontomys megalotis</i> | 9.5 | 19.2 | 11.9 | 3.3 | 5.9 | 246 | 9.0 |
| <i>Peromyscus maniculatus</i> | 5.0 | 4.3 | 1.1 | 2.5 | 6.6 | 124 | 4.5 |
| <i>Neotoma lepida</i> | 0.1 | — | — | — | — | 1 | tr. |
| <i>Microtus pennsylvanicus</i> | 55.6 | 49.8 | 62.8 | 70.7 | 61.7 | 1617 | 59.2 |
| <i>Microtus montanus</i> | 25.3 | 20.8 | 16.6 | 16.8 | 19.7 | 590 | 21.6 |
| <i>Ondatra zibethicus</i> (juv.) | 0.2 | — | — | — | — | 2 | 0.1 |
| <i>Mus musculus</i> | 0.5 | 2.7 | 1.4 | 0.2 | 0.5 | 21 | 0.8 |
| Birds | | | | | | | |
| <i>Porzana carolina</i> | — | 0.4 | — | — | — | 1 | tr. |
| <i>Sturnus vulgaris</i> | — | — | — | 0.5 | 0.3 | 4 | 0.1 |
| Unidentified bird | 0.8 | 0.4 | 2.5 | 3.0 | 0.7 | 34 | 1.2 |
| Insects | | | | | | | |
| Unidentified coleopteran | 0.2 | — | — | — | 0.5 | 5 | 0.2 |
| Totals | 1231 | 255 | 277 | 393 | 574 | 2730 | 100.0 |

*tr = <0.01%

diet. Habitat suitable for voles was very limited on Antelope Island; dense vegetation usually associated with them occurred only in a narrow band at a few places along the lake shore, around a few springs, and in an irrigated hay field. The owls must have concentrated their foraging efforts in those limited areas. The deer mouse (*Peromyscus maniculatus*) is the most abundant small mammal on the islands in the Great Salt Lake (Neil Jensen, personal communication), but they ranked only a distant fourth in species abundance in the owl diet. The valley pocket gopher (*Thomomys bottae*) was the only small nocturnal mammal known to exist on the island not taken by the owls.

My continuing, long-term study of barn owl ecology in Box Elder, Weber, and Davis counties, Utah (Marti unpublished data) overlapped with the years reported here for the Antelope Island material. Data from the long-term study, being done in agricultural land, provides some interesting comparisons for the Antelope Island data. Antelope Island and the main study area are 27 km apart at the closest point. Major differences between the two sites are in vegetation and topography. The mainland study area is essentially flat, and irrigated crops and pastures replace native vegetation. Antelope Island has much more topographic relief, rising from about 1,260 m to 1,999 m, and is covered almost entirely

with vegetation typical of Great Basin deserts. Despite these differences, the same five prey genera (*Microtus*, *Peromyscus*, *Reithrodontomys*, *Mus*, and *Sorex*) contributed 97% of the diet in both areas. Only minor differences in the order of species abundance occurred between diets in the two areas. Meadow voles and montane voles were first and second in both, whereas deer mice and harvest mice exchanged places (third and fourth), as did house mice (*Mus musculus*) and shrews (fifth and sixth) between island and mainland. Year-by-year comparisons between island and mainland diets showed that shrews and house mice were taken less frequently in every year on the island than on the mainland. Deer mice occurred less frequently in the island diet for four of five years, but the reverse was true for harvest mice. The two vole species combined were more frequent prey on the island in three of five years and overall (80.8% versus 77.5%); meadow voles were taken at a higher frequency in every year of the island than on the mainland, but the opposite was true for montane voles. The desert woodrat (*Neotoma lepida*) and Ord's kangaroo rat (*Dipodomys ordii*) were in the island but not the mainland diet. Habitat for these has been eliminated by irrigation agriculture in the mainland study area. Two other species, the Norway rat (*Rattus norvegicus*) and pocket gophers, were eaten by owls on the mainland but not on the

island. Norway rats probably do not occur on the island, which has had very little human habitation, but pocket gophers are found there. I cannot offer a satisfactory explanation of why island barn owls did not appear to capture gophers.

It is presumed that the Antelope Island barn owls foraged entirely on the island and, thus, that their diet reflected prey species found there. I base this on investigations of barn owl foraging ranges done elsewhere and on the tenets of central-place foraging theory. Orians and Pearson (1979) contended that animals should reduce costs of obtaining food as much as possible. One way to do this is to forage close to the nest site (central place) and reduce traveling time. For the Antelope Island barn owls this means foraging on the island and not crossing over to the mainland to hunt. Minimum distance from the island collection site (nest/roost) to the mainland was more than 10 km during 1980–1984. Hegdal and Blaskiewicz (1984) found a maximum distance from roost to hunting areas of 5.6 km in radio-tagged barn owls.

Note that these comparisons are between the diet from one collection site each year on the island and 26–31 sites on the mainland. The sample size from the mainland was much larger ($n = 41,453$) and represented year-round prey data whereas the island sample was mainly from late winter through summer. Although these differences could affect comparisons between diets from the two sites, it seems unlikely that they would cause major misconceptions.

In conclusion, barn owls selected very similar prey on Antelope Island and in agricultural lands adjacent to the Great Salt Lake despite the very different vegetation in the two

places. Dietary evidence indicated that the owls concentrated their foraging efforts in habitat suitable to voles in both localities. This type of habitat is abundant and widespread in the mainland study area but limited and concentrated on Antelope Island.

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LITERATURE CITED

- BOWERS, M. A. 1983. Insular biogeography of mammals in the Great Salt Lake. *Great Basin Nat.* 42: 589–596.
- DURRANT, S. D. 1952. Mammals of Utah: taxonomy and distribution. Natural History Museum, Univ. Kansas Publ., Lawrence, Kansas.
- GLUE, D. E. 1967. Prey taken by the barn owl in England and Wales. *Bird Study* 14: 169–183.
- HEGDAL, P. L., AND R. W. BLASKIEWICZ. 1984. Evaluation of the potential hazard to barn owls of talon (Brodifacoum bait) used to control rats and house mice. *Environ. Toxicol. Chem.* 3: 167–179.
- MARTI, C. D. 1974. Feeding ecology of four sympatric owls. *Condor* 76: 45–61.
- ORIAN, G. H., AND N. E. PEARSON. 1979. On the theory of central place foraging. Pages 155–177 in D. J. Horn, G. R. Stairs, and R. D. Mitchell, eds., *Analysis of ecological systems*. Ohio State University Press, Columbus, Ohio.
- STICKEL, W. H., AND L. F. STICKEL. 1948. Mammals of northwestern Texas found in barn owl pellets. *J. Mammal.* 29: 291–293.
- TWENTE, J. W., AND R. H. BAKER. 1951. New records of mammals from barn owl pellets. *J. Mammal.* 32: 120–121.
- WALLACE, G. J. 1948. The barn owl in Michigan. *Mich. Agric. Expt. Sta. Tech. Bull.* 208.